Poultry House Construction

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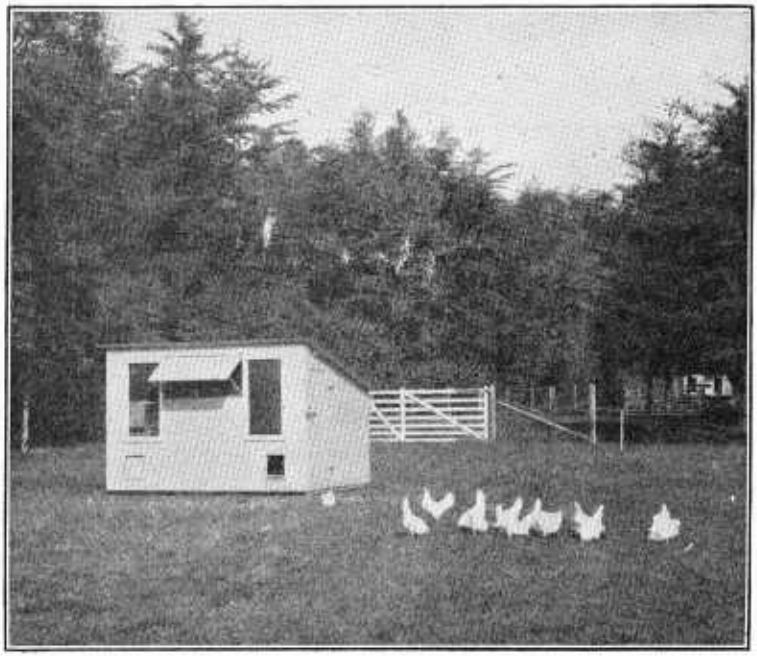

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HENS need a comfortable house which is dry and roomy and abundantly supplied with fresh air and sunlight. It never pays to overcrowd the fowls.

Small or colony houses and long laying houses make good quarters for hens, the best type depending on conditions.

It is easier to keep the birds healthy and to reproduce the stock under the colony system if the birds are allowed free range. Breeding stock, and especially growing chickens, should have an abundant range, while hens used solely for the production of market eggs may be kept on a very small area.

Detailed information on how to build and working plans of various types of poultry houses are given in the following pages. With these anyone handy with carpenter's tools may readily construct similar poultry houses.

POULTRY HOUSE CONSTRUCTION.

CONTENTS.

ESSENTIALS IN POULTRY HOUSES.

THE prime essentials in poultry houses are fresh air, dryness, sunlight, and space enough to keep the birds comfortable. No particular style of house is peculiarly adapted to any section of this country. A house which gives satisfaction in Maine will also give good results in Texas or California, but it is preferable to build more open, and consequently less expensive, houses in the South than in the North. The best site for the poultry house depends principally on the local conditions. The location should have good water and air drainage, so that the floor and yards will be dry, while the house should not occupy a low pocket or hollow in which cold air settles, and it should be situated for convenience in management and adapted to the available land. Wherever possible a southern or southeastern exposure should be selected, although this is not essential if there is any good reason for facing the house in a different direction.

Poultry can be raised successfully on any well-drained soil. A light loam which will grow good grass is well adapted for this purpose, while a very light sandy soil through which the water leaches freely will stand more intensive poultry conditions, but most of the green feed for the fowls kept on such a soil will have to be purchased. A heavy clay or adobe soil is not as well adapted to poultry raising, as such land does not drain readily, and it is much more difficult to keep the stock healthy. Long stationary houses, or the intensive system, saves steps, but it is easier to keep the birds healthy and to reproduce the stock under the colony system, where the birds are allowed free range. Breeding stock, and especially growing chickens, should have an abundance of range, while hens used solely for the production of market eggs may be kept on a very small area with

good results. The colony house system necessitates placing the houses, holding about 100 hens, from 200 to 250 feet apart, so that the stock will not kill the grass. The colony system may be adapted to severe winter conditions by drawing the colony houses together in a convenient place at the beginning of winter, thus reducing the labor during these months.

YARDS AND FENCES.

Fences dividing the land into yards increase the cost of equipment, labor, and maintenance, and there should be as few fences as possible, as land can be cultivated and kept sweet more easily if not fenced, and the value of fresh, sweet land for poultry can hardly be overestimated. A grass sward can be maintained on good soil by allowing 200 to 250 square feet of land per bird (217 or 174 birds to the acre), while more space is necessary on poor or light land. A larger number of fowls are usually kept to the acre where double yards are used, and the land is frequently cultivated. Plymouth Rocks and the heavy meat birds in small yards require fences 5 to 6 feet high, while a fence 6 to 7 feet high is necessary for Leghorns. The upper 2 feet of the fence for the latter may be inclined inward at an angle of 30 degrees, or a strand or two of barbed wire may be used on top of the regular wire to help keep them confined, while it is sometimes necessary to clip the flight feathers of one wing of those birds which persist in getting out. It is not advisable to use a board or strip along the top of the fence, as hens will often fly over one so constructed.

Posts may be set or driven into the ground. They should be set 8 to 10 feet apart for common poultry netting, or 16 to 20 feet for woven wire. Corner posts should be about 8 inches in diameter and be set 4 feet in the ground, while intervening posts may be 4 or 5 inches in diameter and set 3 feet in the ground. Much lighter posts may be used for temporary fences and may be driven into the ground. That part of the post which is set in the ground may be charred or treated with some wood preservative to advantage, while corner posts should be firmly braced or set in cement.

CONSTRUCTION OF POULTRY HOUSES.

A house constructed for the convenience of the attendant will have enough cubic air space provided 2 to 5 square feet of floor space is allowed per fowl. Fresh air should be secured by ventilation rather than by furnishing a larger amount of cubic air space than is required for the convenience of the attendant. The necessary amount of floor space depends upon the system, on the size of the pens, the weather conditions, and the size of the birds. More birds can be kept on a small floor area under the colony than on the inten-

sive system, where the colony system is used in a mild climate and the hens have free range throughout most of the year. Colony houses holding from 30 to 75 hens are about as large as can be easily moved, but larger numbers may be kept in one flock in a long house. Flocks of from 60 to 150 are well adapted to the average conditions for the production of market eggs. Large numbers require less labor, fewer fences, and a lower house cost than small flocks, but there is a greater chance for disease and the individual hen receives less attention. The cost of housing poultry depends upon many conditions, such as price of lumber, style of house, amount of floor space allowed per bird, etc. Substantial poultry houses can be built for from $1.00 to $1.75 per

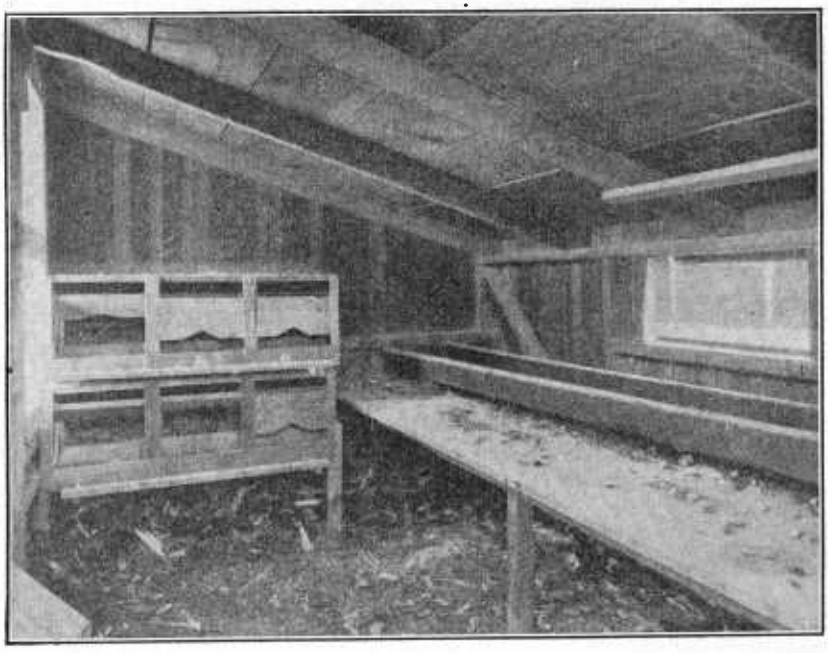


FIG. 1.—Interior of colony house used at Government Poultry Farm, Beltsville, Md.

head, including labor. The cost of material per head will vary from 75 cents to $1.25.

ROOF AND FRONT.

The roof is the most expensive but a most important part of the poultry house, and should be water-tight. Shingle roofs should have a one-third pitch, while those covered with paper or metal may have a less pitch, or be almost flat; however, the greater the slope the longer the life of the roof. Different types of roofs and the comparative amount of surface to be covered are illustrated in figure 5. The shed or single-slope roof is adapted to houses up to 16 feet in

width. It is one of the easiest styles to construct. It allows a high front to the house, and furnishes a northern slope for the roof on which roofing paper will last longer than on a roof which faces

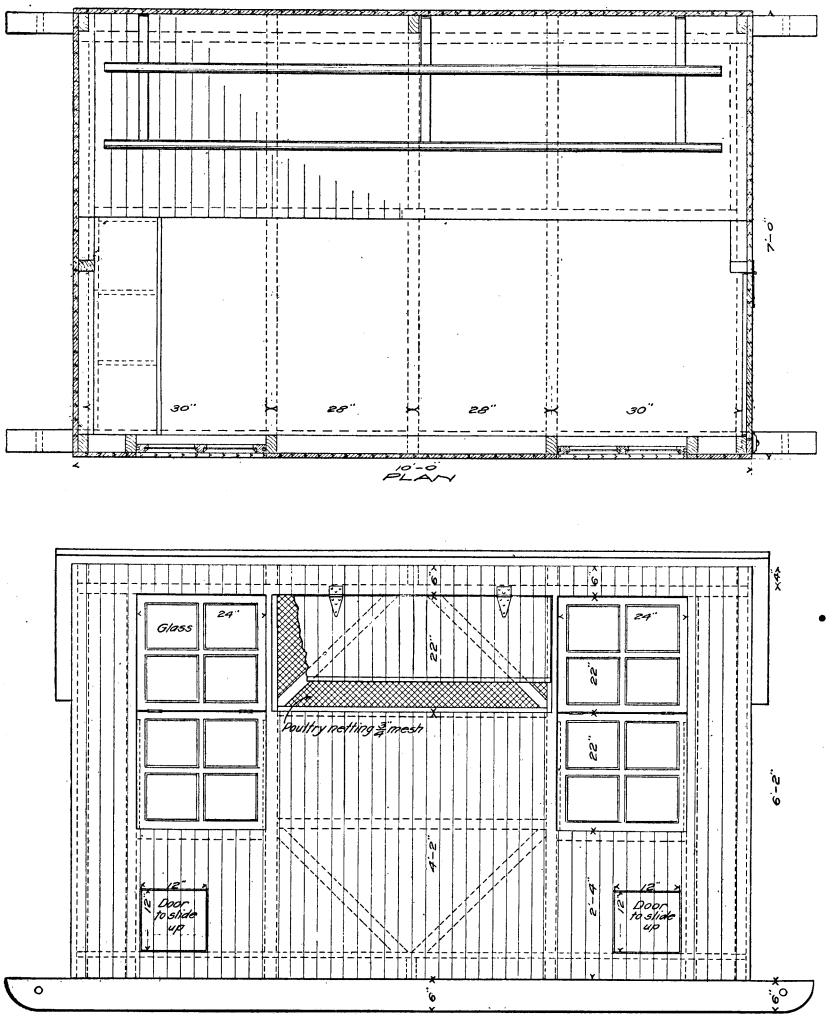


FIG. 2.—Floor plan of colony house used at Government Poultry Farm, Beltsville, Md. Capacity, 25 hens. (See illustration on title-page.) This house is built on runners so that it can be easily moved.

the south. The combination and semimonitor roofs are adapted for buildings from 16 to 24 feet wide, while either of these styles, or the monitor and the gable roof, may be used for wider buildings. The

combination roof on a house over 16 feet wide gives the best head room at the least cost, reduces the amount of surplus air space, and gives a neat appearance to the buildings; while the semimonitor and monitor types are best for wide houses which have a central alley, particularly brooder houses. The semimonitor house usually faces south, while the monitor type of roof is frequently used on buildings

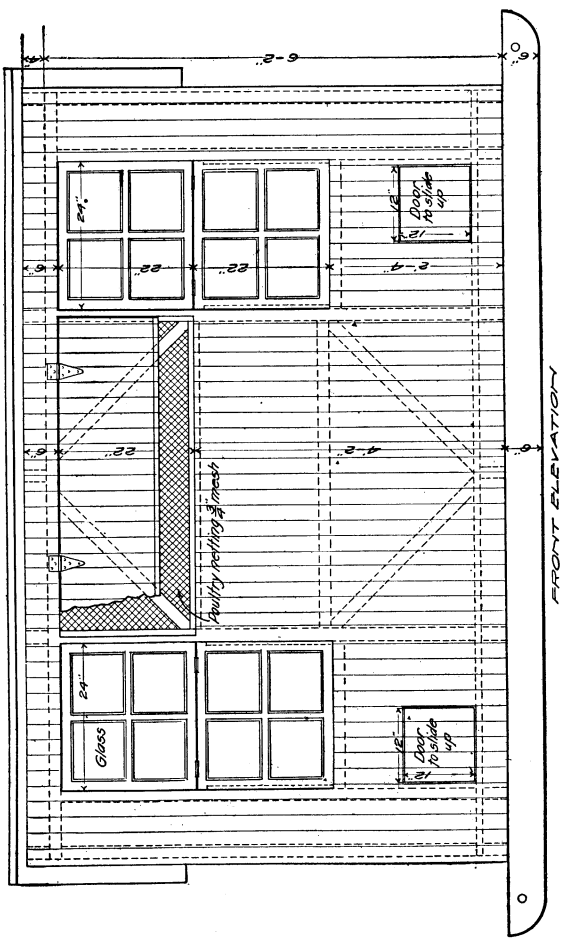
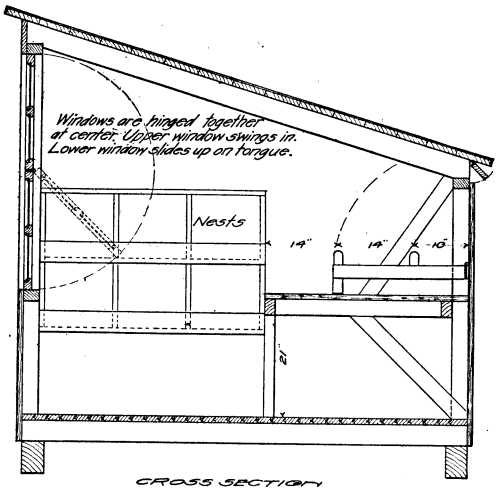
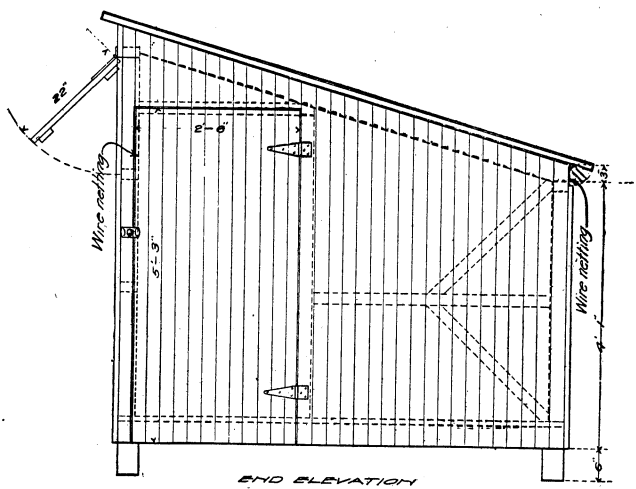


FIG. 3.—Front elevation of colony house used at Government Poultry Farm, Beltsville, Md. Capacity, 25 hens.

facing east or west. The gable roof is used extensively for two-story buildings, for brooder houses, and for incubator cellars. This style of roof is usually ceiled at or slightly above the eaves, or the gable may be filled with straw or some kind of absorbent material, which tends to keep such houses dry and warm. The A-shaped roof is used for growing coops and colony houses which, with a wall 18 inches high, provides a large amount of floor space with a minimum





BILL OF MATERIAL FOR COLONY HOUSE

USE	SIZE	NO. OF PIECES	LENGTH FEET	BOARD MEASURE
Sills (runners)	4"x6"	2	12'	48'
Joists	2x4"	3	14'	28'
Studs & braces	2x3"	13	12'	78'
Rafters	2x4"	3	16'	32'
			Total	186'
7/8" Matched flooring (floor & sides)				340'
7/8 Sheathing, surfaced one side.				100'
Roofing paper, 1 roll.				
Windows, hardware etc.				

FIG. 4.—Cross section and end elevation of colony house used at Government Poultry Farm, Beltsville, Md. Capacity, 25 hens.

amount of lumber, but increases the roof surface, which is the most expensive part of the house.

A large amount of glass in the front of the house makes it warm during the day and cold at night, as glass radiates heat very rapidly. Unbleached muslin, or a light weight of duck cloth, is used for curtains in the fronts of poultry houses. This cloth should be thin enough to allow a slow circulation of air without a draft, which object is defeated by using too heavy a grade of duck or by oiling or paint-

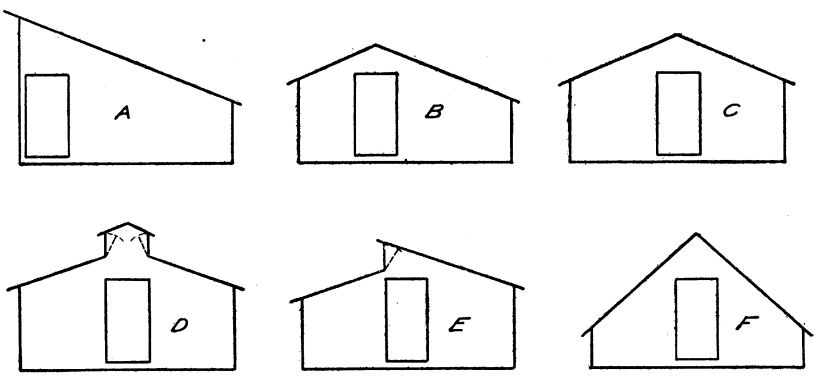


FIG. 5.—Types of roofs for poultry houses. *A*, shed; *B*, combination; *C*, gable; *D*, monitor; *E*, semimonitor; *F*, A-shaped.

ing the cloth. The front of the house should be high enough so that the windows or openings will allow the sun to shine well back into the house during the winter. The depth which the sun's rays shine onto the floor of the house in the vicinity of Washington, D. C., (latitude 40° N.), on January 1, is given in the accompanying table.

Top of windows.	Depth of sun.	Top of windows.	Depth of sun.
Ft. in.	*Ft.*	*Ft. in.*	*Ft.*
3 6	8	6 2	14
4 5	10	7 1	16
5 4	12	7 11	18

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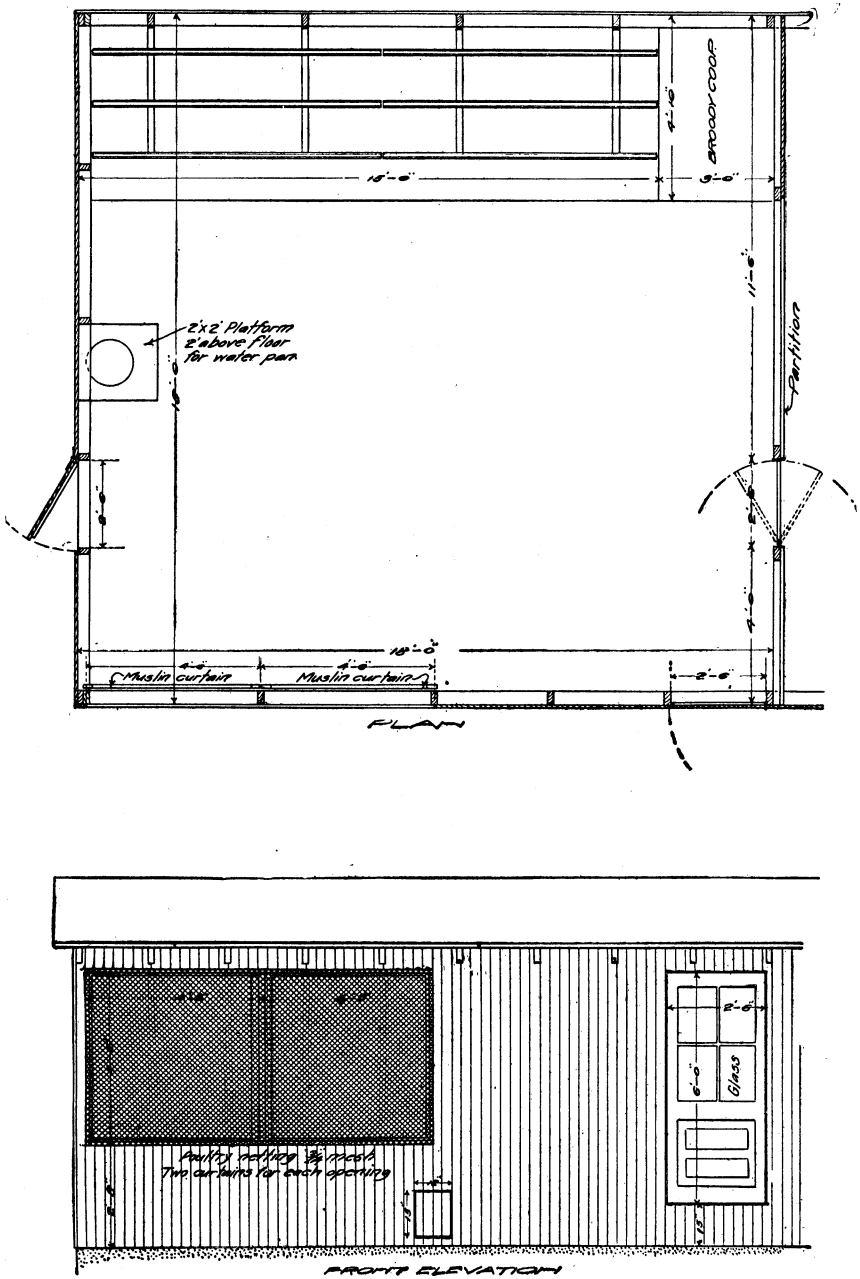


FIG. 6.—Floor plan and front elevation of laying house used at Government Poultry Farm, Beltsville, Md. Capacity, 500 hens. (See figure 8.)

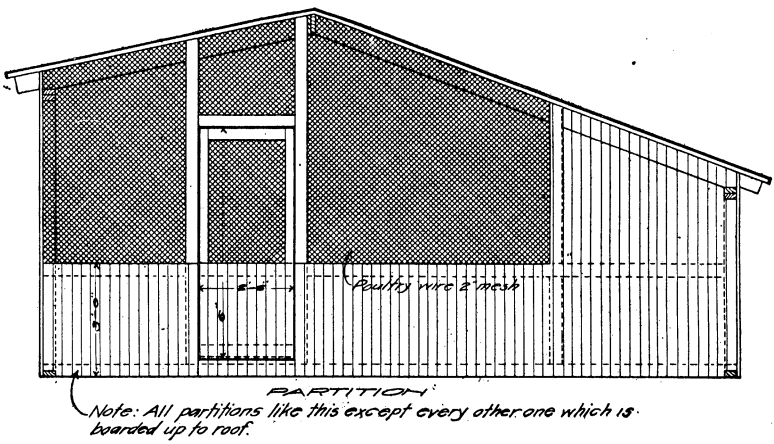
BILL OF MATERIAL FOR LAYING HOUSE 18 BY 108 FEET.

Use.	Size.	Number of pieces.	Length.	Board measure.
	Inches.		*Feet.*	*Feet.*
Sills	2 by 4	30	12	240
Plates	2 by 4[1]	44	12	352
Ties for rafters	1 by 5	30	16	220
Rafters	2 by 6	56	14	784
Do	2 by 6	56	10	560
Studs	2 by 4	38	12	304
Studs (front)	2 by 4	28	8	150
Roosts	2 by 3	36	8	144
Total				2,754

	Feet.
Sheathing surfaced one side for roof	2,860
Matched flooring for walls, partitions, and droppings board	3,200
Boards planed both sides for nests	300

[1] Doubled.

340 running feet of 1 by 3 inch furring for curtain frames. 300 square feet of ½-inch mesh wire for front. 300 square feet of 2-inch mesh wire for partitions. 350 square feet of muslin cloth for curtains. Prepared roofing paper to cover 2,700 square feet. 8 outside doors. Hardware (hinges, nails, staples, etc.). Cement wall or posts (either cement or wood) for foundation. If posts are used the sill should be 4 by 4 inches instead of 2 by 4 inches, thus doubling the number of feet (board measure) required for sills.



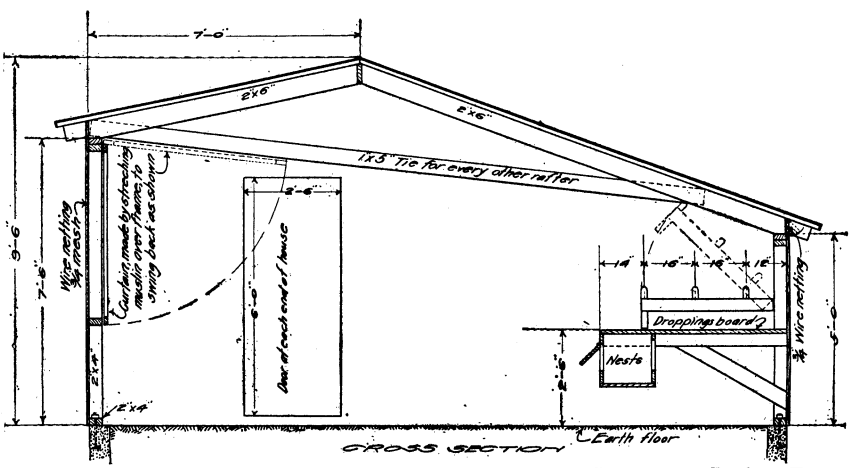


FIG. 7.—Partition and cross section of laying house used at Government Poultry Farm, Beltsville, Md. Capacity, 500 hens. (See figure 10.)

FLOOR.

The best kind of a floor depends upon the soil and the use of the house. On light, sandy, well-drained soils a dirt floor is satisfactory, especially for small or colony henhouses. Such floors should be from 2 to 6 inches higher than the outside ground surface, and it is advisable to renew them each year by removing the contaminated surface down to clean soil, and to refill with fresh sand or fine gravel and earth. A board floor is generally used where the level of the floor in the house is from 1 to 3 feet above the ground surface and in portable houses on land which is not well drained. Board floors harbor rats and rot quickly, and should be raised some distance off the

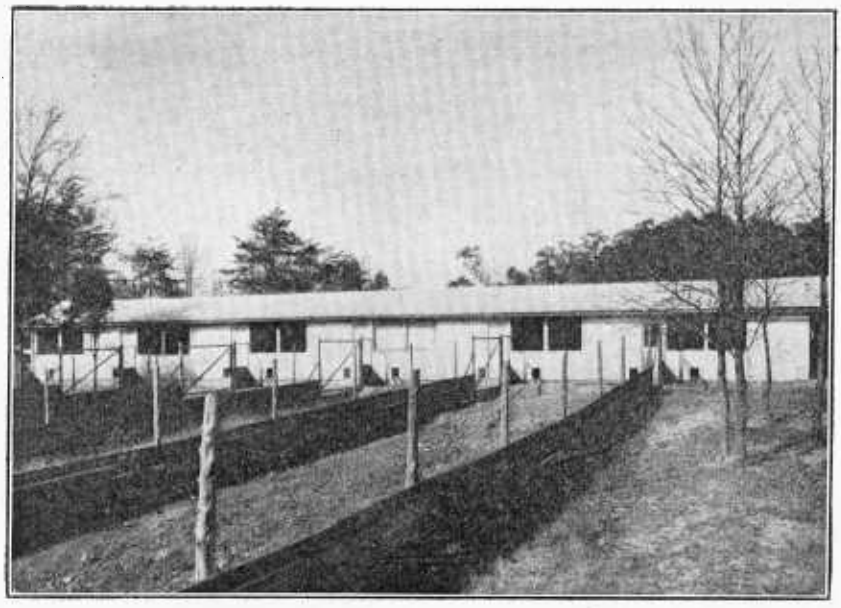


FIG. 8.—Laying house used at Government Poultry Farm, Beltsville, Md. Capacity, 500 hens.

ground so that cats or dogs can get under them, which also allows a free circulation of air to prevent the wood from rotting. Cement floors are adapted to long permanent buildings, brooder houses, incubator cellars, and to all permanent houses where an artificial floor is required and can be built on the ground level. These floors are easy to clean, very sanitary, rat proof, and comparatively inexpensive, if one has a cheap supply of gravel or sharp sand.

PARTITIONS.

The lower 3 feet of all partitions may be solid, entirely across the pen, or solid partitions across the houses may be made every 40 or 50

feet, depending upon the length of the house. Solid partitions closer than this are unnecessary and interfere with free circulation of air in warm weather.

ROOSTS AND DROPPING BOARDS.

The interior fixtures of the pens should be simple, inexpensive, and easy to clean. Roosts are usually placed next to the end or back

Bill of material for colony growing coop.

Use.	Size.	Number of pieces.	Length.	Board. measure.
	Inches.		*Feet.*	*Feet.*
Sills (runners)	3 by 4	2	8	16
Joists	2 by 4	2	10	14
Studs and braces	2 by 3	8	12	48
Rafters	2 by 4	3	12	24
Total				102
⅞-inch matched flooring (sides and floor)				175
⅞-inch sheathing surfaced on one side (roof)				36
Roofing paper, one-half roll.				
Hinges and hardware.				

walls, 6 to 10 inches above the dropping boards, while the latter are from 2 to 2½ feet above the floor. They should all be on the same level, otherwise the birds will crowd and fight to get on the highest roost. Scantling 2 by 3 inches or 2 by 4 inches, with the upper edges rounded off, makes good roosts with either the wide or narrow surface up. Allow 7 to 10 inches of roost space per fowl, according to the size of the birds. Roosts should be placed about 15 inches apart, but the outside ones may be within 10 inches of the edge of the dropping boards.

Nests may be placed under the dropping boards, on the partition walls, or in any convenient place where they do not take up floor space, and should be arranged so that the birds can get into them easily. They should be 12 to 14 inches square and 12 to 16 inches high, with a strip about 4 inches high on the open side to retain the nesting material. Provide one nest for every four or five hens. Trap nests are essential in any careful breeding work, such as pedigree breeding, or the breeding of exhibition poultry. For information about trap nests see Farmers' Bulletin 682, A Simple Trap Nest for Poultry.

KINDS OF MATERIAL USED FOR BUILDING.

Houses made entirely of solid concrete are cold and damp, but concrete blocks may be used with good results. Hollow tile makes a very good poultry house, and it can be bought in some sections at a price which compares favorably, considering its durability, with wood. This construction is well adapted to incubator cellars and brooder houses, or to any buildings requiring double walls and good insulation.

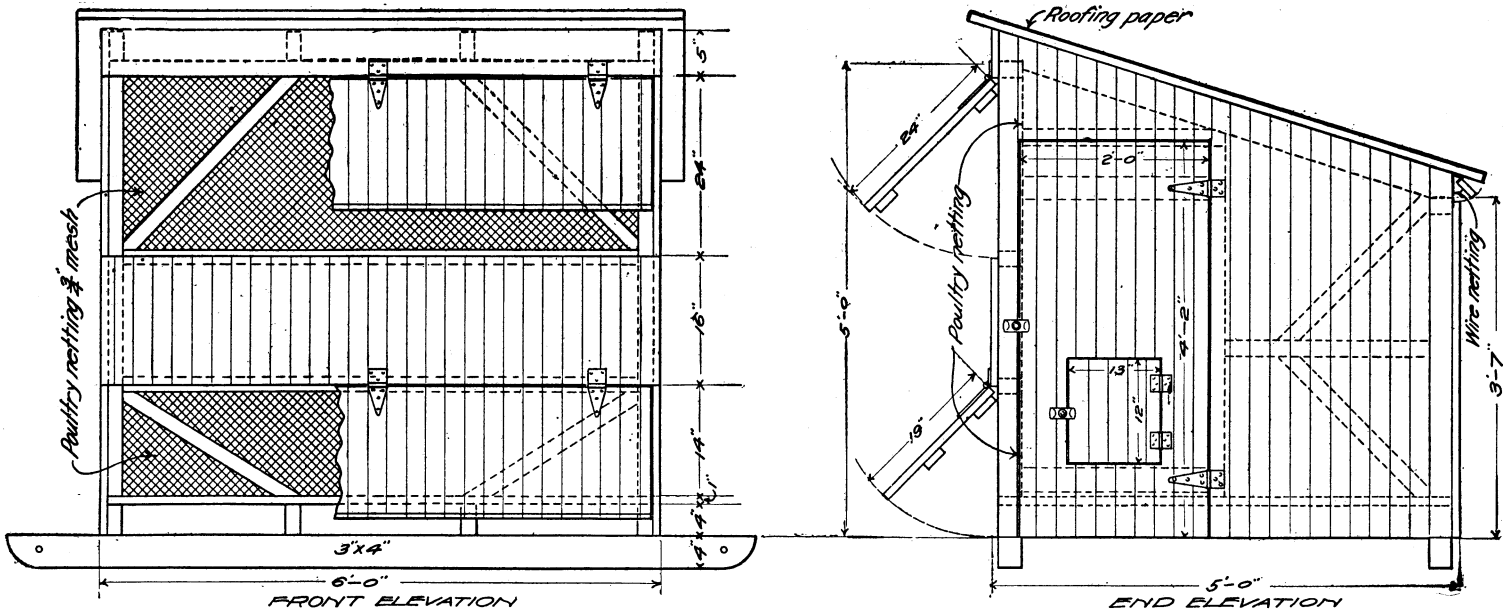


FIG. 9.—Colony growing coop used at Government Poultry Farm, Beltsville, Md. This house is built on runners so that it can be easily moved.

[Bill of material on page 13.]

All kinds of wood are used in building poultry houses, and any durable lumber which is available for that purpose may be used. The lumber which is to be used for the outside construction should be well seasoned, otherwise the shrinkage will leave cracks in the walls. Hemlock, spruce, western white pine, and Virginia pine are commonly used for sheathing in the North, hard pine in the Gulf States, and redwood or Oregon pine on the Pacific coast. Clear spruce, Oregon, Georgia, North Carolina, and Virginia pine are used for siding. Chestnut is used locally for sheathing and siding in some parts of New England and the Alleghenies, while local pines of different species are available for rough lumber in many sections.

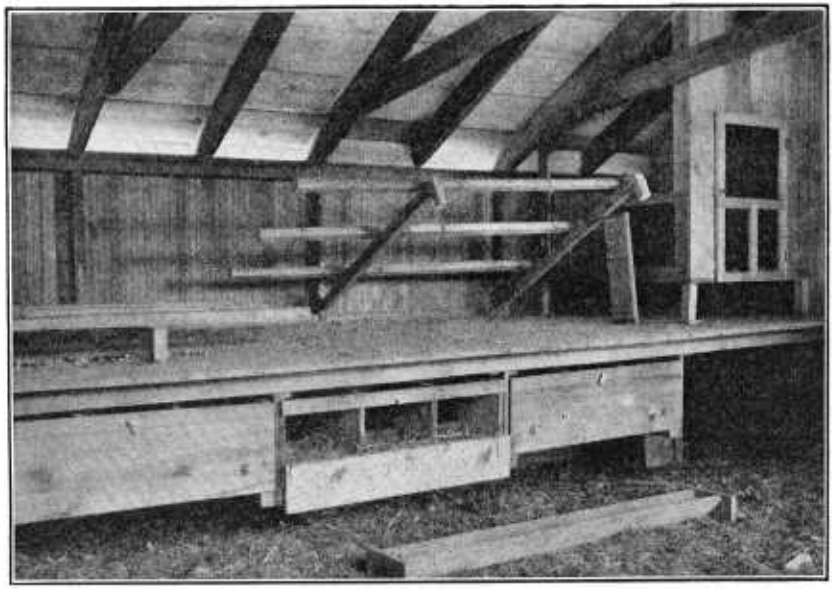


FIG. 10.—Interior of pen in laying house used at Government Poultry Farm. Roosts, dropping board, and nests. (See figure 7.)

Northern yellow pine, Georgia, Virginia, and North Carolina pine are used for light framing (studs, rafters, sills, plates, purlins, etc.). Oregon and Georgia pine are used for sills and runners. The best shingles are made of cypress and cedar, and white pine is also used. Asbestos shingles are quite durable, but more expensive than wooden ones. Cedar, chestnut, redwood, cypress, and locust make the best posts. Second-hand lumber or lumber from large packing or piano boxes can be used in building small poultry houses. Lumber comes in even lengths, usually 10, 12, 14, and 16 feet long, and if second-hand lumber is to be utilized, it may be advisable to plan the house according to the length of the lumber. Care should be taken in or-

dering a bill of lumber to secure lengths which will cut to the best advantage in building.

FRAMEWORK OF THE BUILDING.

The sills are placed on posts, stones, or cement supports, or directly on cement walls. Wooden floors should be from 10 to 18 inches above the ground, while cement floors are built directly on it, but the site should be elevated enough so there is good drainage away from the building. Posts should be from 6 to 8 inches in diameter, placed 6 to 8 feet apart and set 2 to 3 feet in the ground or below the frost level, which varies with the locality. Sills may be 2 by 4 or 4 by 4 inches, depending upon the size and construction of the building; 2 by 3 or 2 by 4 inches are heavy enough for colony houses or those of light, single-wall construction, which are not over 10 or 12 feet deep and 4 to 7 feet high. Sills 4 by 4 inches are used for larger

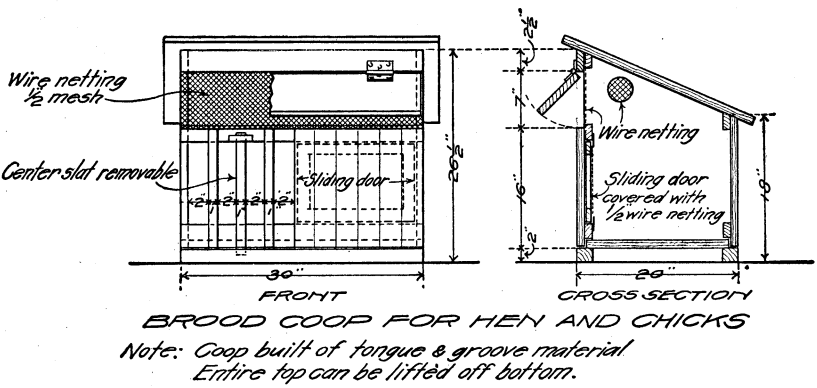


FIG. 11.—Brood coop for hen and chicks, used at Government Poultry Farm.

buildings and for houses with double walls. Runners 3 by 4 or 4 by 6 inches are used as sills for portable houses, as the latter require heavy framework. Sills 4 by 6 inches are used in two-story henhouses or other large poultry buildings and should be set on edge unless on a cement or stone wall, when a lighter sill may be used which is set flat. Concrete walls are commonly used as foundations for large poultry houses, with a 2 by 4 for the sill, which is bolted to the walls. The posts or supports must set closely together if light sills are used. Floor joists may be of 2 by 4 or 2 by 6 inch lumber, their size depending somewhat on the amount of weight which the floor has to sustain, and should be set from 16 to 20 inches apart. Fix one line or side of the proposed house, and with this as a base locate the other corner posts by using the 6, 8, and 10 foot combination, measuring 6 feet from the corner of the fixed line and 8 feet from the same corner at right angles, which point is fixed by a rule 10 feet long

running from the 6-foot mark of the fixed line to the end of the 8-foot line, thereby making a square corner. A triangle whose sides are 6, 8, and 10 feet long, respectively, contains a right angle opposite the hypothenuse or diagonal side. For small buildings drive a stake at the selected corner for the house, and nail a straightedge to this stake at the desired height of the posts or floor, using a spirit level on this straightedge to mark the posts at the same level. A transit is generally used in laying out large buildings.

The studding or uprights are placed on the sill and should be set plumb with a spirit level and be well braced until sheathed. Sills are halved or spliced and nailed together at the joints or ends. The studding is toenailed to the sills, while the plates are spiked to the

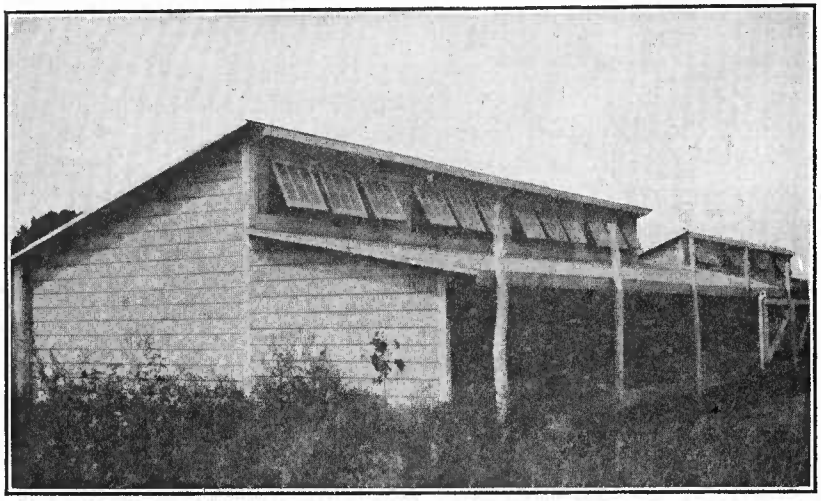


Fig. 12.—A semimonitor style of laying house.

top of the studding. Studding is set 2 to 4 feet apart on the rear walls and ends of poultry houses and is placed to fit the windows, curtains, and doors in the front and ends. Less studding is required if the building is boarded up and down rather than horizontally, as in the former case only a few studs with cross-studding or ties are required. The studs should be placed so that the lumber will cut to good advantage, as lumber usually comes in even rather than odd lengths. Studs 2 by 3 or 2 by 4 inches are commonly used, the former for small or colony houses and the latter for larger buildings. Plates are made of 2 by 4 inch scantling or 2 by 4 inch scantling doubled and spiked together and are usually laid flat on the top of the studs, while the corner studs may also be doubled. Rafters may be of 2 by 4 or 2 by 6 inch lumber; the first is used only in light buildings where the rafters are not over 16 feet long; and the latter

in climates where the roofs must sustain much weight of snow. It is advisable to use a purlin in buildings where rafters are over 14 feet long. Purlins are usually made of 2 by 4 or 2 by 6 inch material set on edge. They are placed lengthwise of the house about halfway between the front and back walls and make a support for the rafters. A ridge board may be placed between the ends of the rafters at the apex of the house to keep the ridge straight and even, but this is not necessary on most poultry houses. Collar beams or crossties 1 by 6 inches are used to connect and strengthen the front and rear rafters on two-pitch, gable, or combination roofs. They should be placed as low as possible on the rafters, so as to stiffen the frame, but not to interfere with head space. They should not be placed so low that the hens will roost on them. One pair of rafters may be set in position and the rest marked from these, or a square may be set on the rafter, using the inches on the square to correspond to the feet in the slope of the roof and the rafters marked from the angle thus obtained, so that they will fit correctly. Rafters should only be notched or cut enough to fit tightly where they rest on the plates; not over 1 inch, as deep notching weakens them. They are usually placed 2 or $2\frac{1}{2}$ feet apart from center to center, so that the sheathing may be used with the least amount of waste.

CONSTRUCTING FLOORS.

Wooden floors are usually made of matched flooring and are generally doubled in cold climates to make them tight and warm, in which case the lower layer of boards is usually laid diagonally to strengthen the floor. Floors of one thickness give good satisfaction in most sections of this country and in growing houses. Three-quarter-inch mesh wire may be used under wooden or dirt floors to keep out rats. In making concrete or cement floors and walls select Portland cement of known reputation, which should be kept in a dry place; use clear, coarse, sharp sand or gravel which does not contain over 5 per cent of clay or silt and crushed stone or gravel one-fourth to 2 inches in diameter. The gravel should be screened through a one-fourth-inch mesh wire screen and the coarse particles used as stone, while the material which passes through the screen is sifted through a 40-mesh wire screen in order to separate the sand, and any material which goes through the 40-mesh wire is thrown away. A mixing board with a smooth surface and a box for measuring the sand and gravel are necessary. Spread the sand on the board and add the cement; mix these thoroughly together; add three-fourths of the required amount of water and then the gravel or stone; mix thoroughly and add water to the dry spots, making the mixture just wet enough to be jellylike. Thorough mixing is very

essential, as the mortar should completely coat all particles of the mixture. Only enough water should be added so that when the concrete is tamped on laying the water will nicely flush the surface.

Good concrete mixtures may be made of 1 part (2 bags) cement, 2 parts sand, and 4 parts stone or gravel, which will take about 10 gallons of water in mixing; or 1 part (2 bags) of cement, 2½ parts of sand and 5 parts of stone or gravel, which is mixed with about 12½ gallons of water. One part is the amount required to fill a wheelbarrow. If natural gravel or sand is used without sifting, make the concrete of 1 part (2 bags) of cement and 4 parts of gravel mixed with about 10 gallons of water, or of 1 part (2 bags) of cement and 6 parts of gravel with about 12½ gallons of water. A coating of clear cement or of 1 part cement and 1 part sand may be added to give a smooth finish to the floor. Most concrete or cement floors are damp and cold and therefore must be quite heavily covered with litter. A 4-inch foundation of cinders, broken stone, or gravel, which should be made firm by tamping, may be laid as a foundation for the cement floor, making the concrete 2½ to 3 inches thick. A layer of tarred building paper, which is lapped and cemented with tar at the seams, may be laid between the stone foundation and the concrete. This construction prevents moisture from coming through the earth and concrete, which makes the floor damp. Cement floors should always be built from 4 to 6 inches above the ground level to insure good water drainage. Concrete floors built on the earth are made from 3 to 4 inches thick, which is covered with a layer one-half to 1 inch thick of the finishing coat described above.

The house shown in figure 13 is a very simple, inexpensive type of house, as it is made of wide boards running up and down, with the cracks covered with 2-inch battens. A house so constructed does not require any studding except one post for each corner and pieces around the door and openings. This house has two muslin curtains hinged at the top which swing inward and are used to close the front of the house on cold nights and may also be closed in very stormy weather to keep the house dry. This house has a slight projection or shutter on the front above the opening which helps to keep the house dry in wet weather when the curtains are open.

MATERIAL FOR COVERING WALLS.

The walls of most poultry houses in the North are built of sheathing and covered with specially prepared paper, siding, clapboards, or shingles. Sheathing paper is generally used on walls and roofs which are to be covered with shingles. A wall made of siding placed directly on the studs makes a satisfactory henhouse in the South. Another method of making a cheap, tight wall used extensively in

colony-house construction, is to use boards 10 to 12 inches in width placed vertically with the cracks covered with battens 2 to 3 inches wide. Battens are usually 1 inch thick, and may be either nailed or screwed to the house. One-inch matched lumber is used extensively in poultry-house construction and makes a very satisfactory wall without any other covering than paint. Narrow lumber, 2½ to 6 inches wide, is usually used for this purpose, as wide boards are apt to shrink and warp, which results in cracks in the walls. The lowest board on the walls should extend into the ground below the sill to make a tight joint, which should also be made at the eaves where it may be secured either by cutting the rafters off even with the rear wall and covering this joint with good roofing paper or by filling in the space between the rafters with boards or muslin curtains. A 4 or 6 inch board may

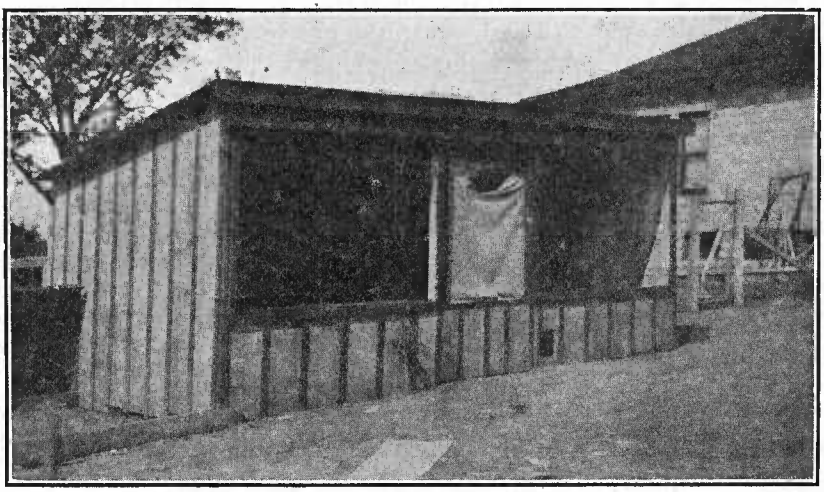


FIG. 13.—A laying house used in Georgia.

be used on the rafters, allowing it to extend out 2 to 4 inches beyond the rear wall, or a double course of shingles may be laid and allowed to extend in this same manner. Sheathing should be laid so as to break joints in order to strengthen the building, while siding is usually laid working from the bottom upward. A shutter may be placed just under the eaves on the outside of the rear wall for summer ventilation. (See fig. 4.) The essential point is to have a rear wall which is tight near the roosts, to prevent drafts from striking the birds.

MAKING THE ROOF.

Special prepared paper or shingles laid on sheathing may be used for covering the roof. Roofing papers are used very extensively for poultry houses at the present time and in many places are replacing

shingles. As a rule, the former are cheaper and easier to lay, while they can be laid on a much flatter roof than the latter. One or two ply paper is usually used on the sides, and one, two, and three ply paper on the roofs, although this varies with different styles and grades of manufacture. This paper generally comes in rolls or squares which cover 100 square feet and contain directions and materials for use in laying. Paper may be used on roofs which have a slope or rise of 1 or more inches to the foot. Sheathing for paper roofs must be planed on one side and laid tightly to present a smooth surface for the roofing paper, while sheathing paper is often used between the sheathing and the roofing paper. Shingles may be laid from 4 to 5 inches to the weather on roofs which have one-third or more pitch, which is a rise of 8 or more inches to the foot, or one-third of the span of a gable roof. Cedar and cypress shingles are usually laid 5 to 6 inches to the weather on walls or on roofs with one-third pitch, but are not generally used on roofs which have a rise of less than 8 inches to the foot. One thousand shingles, or 4 bundles of cedar shingles, are the equivalent of 1,000 shingles 4 inches wide. In shingling, commence at the eaves or lowest edge by laying a double course, while the rest of the layers are of single courses. They are laid either to a chalk line, which is fastened at the right points at either edge of the roof and snapped to make a mark for the lower edge of the tier of shingles, or to a straight-edged stick. Each shingle is nailed with two either 5 or 6 penny nails, driven 7 to 8 inches from the butt, depending upon the lap, so that the heads of the nails will be covered by the next course. One thousand cedar shingles laid 4½ inches to the weather will cover about 125 square feet, depending on their size. Shingles may be laid on narrow sheathing 3 to 5 inches wide, or on common sheathing, which is spaced from 1 to 2 inches apart to allow the roof to dry out quickly, and they should break joints at least 1 inch and as much more as possible.

ESTIMATING THE AMOUNT OF MATERIAL REQUIRED IN BUILDING.

Lumber comes in even lengths, usually 10, 12, 14, and 16 feet long. It is figured at so much per 1,000 feet board measure, which means the number of square feet which the material would cover if it were 1 inch thick. To compute board measure, divide the area of the cross section of the stick of lumber in inches by 12, and multiply by the length in feet. The accompanying table shows the number of feet board measure in lumber from 6 to 16 feet long, with a cross section varying from 4 to 16 inches.

Table of board measure.

Length.	Area of cross section.					
	4 inches.	6 inches.	8 inches.	10 inches.	12 inches.	16 inches.
	Board measure.					
Feet.	*Ft. in.*	*Feet.*	*Ft. in.*	*Ft. in.*	*Feet.*	*Ft. in.*
6	2 0	3	4 0	5 0	6	8 0
8	2 8	4	5 4	6 8	8	10 8
10	3 4	5	6 8	8 5	10	13 4
12	4 0	6	8 0	10 0	12	16 0
14	4 8	7	9 4	11 8	14	18 8
16	5 4	8	10 8	13 4	16	21 4

Boards less than 1 inch thick are usually sold at so much per square foot, the price depending on the thickness of the lumber. Given the dimensions of a simple poultry building, one can work out a general bill of material required for its construction. A working plan of the building should be drawn to a convenient scale, usually one-fourth inch to the foot for poultry houses, showing the ground plan, the

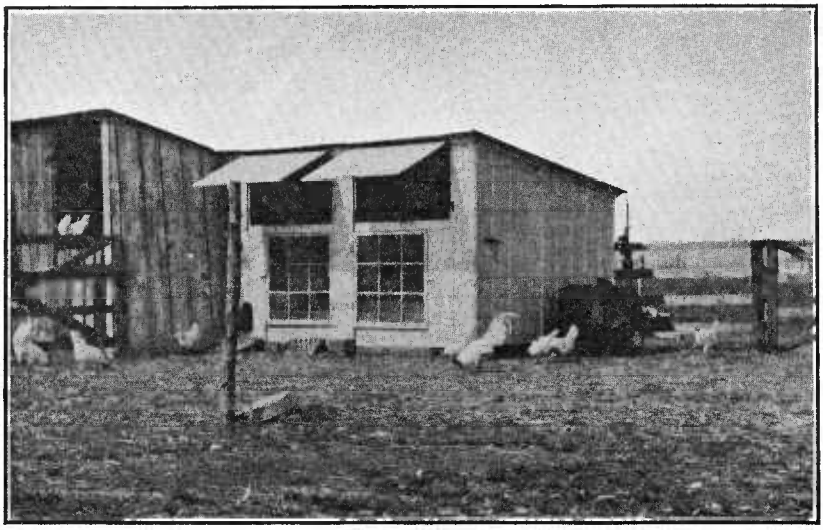


FIG. 14.—A colony house used in Texas.

front elevation, and the end or a cross section of the house. The bill of material can be worked from this plan.

In estimating lumber allow for waste as follows: Common sheathing add one-tenth for waste and one-fourth for matched flooring and all kinds of siding. Wire nails are generally preferred in construction, as they are easier to use than cut nails, although the latter have greater binding power. Use 10 to 20 penny nails for framing; 8 to

10 penny for sheathing; 6 penny finish or casing nails for clapboarding, and 8 penny for siding. Four penny nails are 1½, 6 penny are 2, and 8 penny are 2½ inches long, etc. It takes about 8 pounds of 5 penny nails to 1,000 shingles; 18 pounds of 6 penny for 1,000 square feet, board measure, of beveled siding; 20 pounds of 8 penny and 25 pounds of 10 penny for 1,000 square feet of sheathing; 30 pounds of 8 penny for 1,000 square feet of flooring, and 15 pounds of 10 penny or 25 pounds of 20 penny for 1,000 feet of studding. Allow one bag of cement for about 13 square feet of concrete floor, adding one extra bag for every 10 running feet of foundation wall. This is estimated for a floor made 3 inches of a 1–2½–5 mixture of concrete, covered with one-half inch of a finishing coat, containing equal parts of sand and cement.

The following tools will make a fair outfit for use in constructing simple poultry houses, or one may buy a tool chest and set of tools, which contains most of those mentioned herewith: Medium-sized hammer, hatchet, chisel, mallet, brace, set of bits, screw driver, plane, level, steel square, ripsaw (5 teeth to the inch), crosscut saw (8 to 10 teeth to the inch), compass saw, monkey wrench, oilstone, files, pair of pliers, chalk, and a 2-foot rule.

PAINT.

Painting adds greatly both to the appearance and service of all buildings and appliances. One may buy ready-mixed paints, or may purchase paste pigments and oil and mix them. All surfaces should be clean and dry before they are painted. Use a priming coat made of equal parts of paint and linseed oil and cover with one or more coats of paint, which should be thoroughly brushed into the surface.

WHITEWASH.

Whitewash is the cheapest of all paints, and may be used either for exterior or interior surfaces. It can be made by slaking about 10 pounds of quicklime in a pail with 2 gallons of water, covering the pail with cloth or burlap and allowing it to slake for one hour. Water is then added to bring the whitewash to a consistency which may be applied readily. A weatherproof whitewash for exterior surfaces may be made as follows: (1) Slake 1 bushel of quicklime in 12 gallons of hot water, (2) dissolve 2 pounds of common salt and 1 pound of sulphate of zinc in 2 gallons of boiling water; pour (2) into (1), then add 2 gallons of skim milk and mix thoroughly. Whitewash is spread lightly over the surface with a broad brush.

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